# **Fact Sheet**

# A CABLE-BASED ROOF MOISTURE DETECTION AND LOCATION SYSTEM

#### **PROBLEM**

Early detection of leaks in low-slope, compact roofing systems can save significant maintenance costs, because repairing or replacing these roofs can cost 76 to 108 \$/m² (7 to 10 \$/ft²). Only early detection can prevent a leak from becoming severe and causing significant damage long before it is obvious to building occupants.

#### **HISTORY**

Inspection techniques that detect moisture in roofs from leaks or condensation include on-the-roof and aerial infrared thermography, nuclear moisture meters, and dielectric meters. These methods are labor intensive and provide information on roof integrity only if and when an inspection is performed.

In-the-roof sensor technologies include cable systems and individual sensors. Some cables note the presence of moisture by closing a circuit. A type of individual embedded sensor incorporates water-activated battery-powered autonomous transmitters mounted in an array within the layers of low-slope compact roofing. When the battery becomes wet, the associated transmitter sends a signal that indicates wetting and identifies the location of the transmitter.

Earlier implementations of cable systems were not good at locating wet areas. Individual sensors, upon wetting the batteries, eventually depleted their energy and became inoperative and then could not be reset or recharged once triggered. Their batteries had a limited shelf life and, even if in a dormant state, eventually had to be replaced.

## **SOLUTION**

A cable-based roof moisture detection and location system (patent # 5,648,724) has been tested in simulated conditions. The detection system can use a variety of principles to monitor roofing for the presence of moisture. The location system uses a metallic time-domain reflectometer (MTDR) to locate a suspected wet area by sending an electromagnetic pulse or step signal down the sensor cable and looking for reflections caused by a change in the dielectric constant surrounding the cable caused by the presence of a wet area.

This invention has the following advantages:

- Continually monitors roofing for moisture
- Detects the occurrence of wet areas along the cable
- Alerts when wetness is detected
- Indicates location and extent of single or multiple wet areas.

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